

# **PUBLICATIONS cont.:**

"Achieving Competition: Antitrust Policy and Consumer Welfare." with G. Leonard. World Economic Affairs, Vol. 1, No. 2, 1997.

"The CPI Commission and New Goods." The American Economic Review, May 1997.

"Economic Analysis of Differentiated Products Mergers Using Real World Data," with G. Leonard, George Mason Law Review, 5, 3, 1997.

# **JOINT REPORTS, TESTIMONY, AND BOOKS:**

"Project Independence: An Economic Analysis," Technology Review, May 1974.

"The FEA's Project Independence Report: Testimony before Joint Economic Committee." U.S. Congress, March 18, 1975.

"The FEA's Project Independence Report: An Analytical Assessment and Evaluation." NSF Report, June 1975.

"Energy Demand in the ERDA Plan," with D. Wood, Energy Laboratory Report, August 1975.

"A Note on Computational Simplifications and Extensions of the Conditional Probit Model," EPRI report on choice models, September 1977.

"Labor Supply Response of Males to a Negative Income Tax," Testimony for U.S. Senate Finance Subcommittee on Public Assistance, November 22, 1978.

"Appliance Choice with Time of Day Pricing," Energy Laboratory Report, January 1980.

"Discrete Choice Models with Uncertain Attributes," Oak Ridge National Laboratories Report, January 1980.

"Individual Savings Behavior," with P. Diamond, Report to the National Commission on Social Security, May 1980.

"Wealth Accumulation and Retirement," with P. Diamond, Report to the Department of Labor, May 1982.  
"A Review of IFFS," Report to the Energy Information Agency, February 1982.

"A Model of Heating System and Appliance Choice," with J. Berkovec and J. Rust, Report to the Department of Energy, December 1983.

"Labor Force Behavior of Older Men After Involuntary Job Loss," with L. Paquette, Report to Department of Health and Human Services, December 1985.

"Pollution and Work Days Lost," with D. Wise and B. Ostrow, NBER Working Paper, January 1984; Revised 1985.

"Demand for Interstate Long Distance Telephone Service," with A. Jafee and T. Tardiff, November 1985.

"Competition in the Information Market 1990", August 1990.

"The Welfare Cost to the US Economy of Regulatory Restriction in Telecommunications." January 1995.

**JOINT REPORTS, TESTIMONY, AND BOOKS cont.:**

"Benefits and Costs of Vertical Integration of Basic and Enhanced Telecommunications Services," April 1995.

"Statement on the Natural Resource Damage Provisions of CERCLA," Testimony before the U.S. Senate Committee on Environment and Public Works, May 11, 1995; Testimony before the U.S. House of Representatives, Transportation & Infrastructure Committee, Water Resources & Environment Subcommittee, July 11, 1995.

"Competition in Cellular Markets," Testimony before the U.S. House of Representatives, Committee on Commerce, October 12, 1995.

"Merger Policy in Declining Demand Industries," Testimony before the U.S. Federal Trade Commission, November 14, 1995.

"Expected Results from Early Auctions of Television Spectrums," Testimony before the U.S. Senate Budget Committee and the U.S. House of Representatives, Committee on Commerce, March 13, 1996.

The Choice and Utilization of Energy Using Durables, ed. J. Hausman, Palo Alto: EPRI, 1981.

Social Experimentation, ed. J. Hausman and D. Wise, Chicago: 1985.

Future Competition in Telecommunications, ed. S. Bradley and J. Hausman, Harvard: 1989.

Contingent Valuation: A Critical Appraisal, ed. J. Hausman, North Holland, 1993.

Globalization, Technology and Competition, ed. S. Bradley, J. Hausman, R. Nolan, Harvard 1993.

Economic Impact of Deregulating U.S. Communications Industries, The WEFA Group, Burlington, MA, February 1995.

## **ATTACHMENT B**

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**FEE ALTERNATIVES FOR ANCILLARY OR  
SUPPLEMENTARY SERVICES OFFERED BY DIGITAL  
TELEVISION BROADCASTERS**

**(MM DOCKET 97-247)**

**What can be learned from licensing rates for technology in the private  
sector?**

**by**

**Kent P. Anderson, Ph.D.**

**April 28, 1998**

# **FEE ALTERNATIVES FOR ANCILLARY OR SUPPLEMENTARY SERVICES OFFERED BY DIGITAL TELEVISION BROADCASTERS – WHAT CAN LICENSING RATES FOR TECHNOLOGY TELL US?**

## **I. INTRODUCTION AND CONCLUSION**

The FCC has requested comment on alternative types and levels of fees that might be assessed on broadcasters' use of excess digital capacity to provide certain services. These services would be "ancillary or supplementary" to broadcasters' provision of digital television signals. They could include such things as subscription television services, computer software distribution and data or audio transmission.

The Commission's order describes several types of fees that might be considered, among them a fee based on a percentage of the revenue received for ancillary services. In this report I focus on the following question: Were the Commission to determine that a fee of this type should be set, what would be an appropriate percentage rate? More specifically, I review information about the rates at which various kinds of technology have been licensed in the private sector. That information shows that some technologies earn royalties on the order of 2 to 3 percent or less, most earn royalties of 5 percent or less, and only those technologies with unusually favorable economics receive rates of more than 10 percent.

At present very little is known about the economics of ancillary services. As far as I am aware, there is no information available to suggest that the economics are unusually favorable. Moreover, the risk associated with future profits in the provision of ancillary services seems high given the newness of the technology and the total lack of broadcaster experience in the provision of these services.

The Commission has indicated that, while it wishes to recover for the public a portion of the value of the spectrum that it has granted to broadcasters, it is also seeking not to dissuade broadcasters from offering ancillary services. The Commission further recognizes that it has the

authority to adjust the percentage rate after gaining more information about the economics of ancillary services. In light of these facts, the Commission might best achieve its objectives by setting the initial rate low. A conservative approach is particularly justified in the case of a fee applied to revenues, since such a fee makes no allowance for actual net profit. That is, the fee must be paid regardless of whether the service is in fact profitable. If the provision of ancillary services proves to be unusually profitable, the Commission can increase the fee.

## **II. ECONOMICS OF ROYALTY RATES**

In a negotiation between private parties, the royalty set for the licensing of a particular technology depends upon several things: the maximum amount the licensee is willing to pay, the minimum amount the licensor is willing to accept and various factors that affect where within this range the royalty will fall. These include such things as the amount of information available to each party, the cost of getting additional information, the parties' experience and abilities in negotiation and, not least, human emotions. The maximum amount that a licensee is willing to pay depends upon the incremental profits that the licensee can expect to earn from exploitation of the technology – with future profits discounted at an appropriate risk-adjusted rate. The minimum amount that the licensor will accept is a payment or a stream of expected payments whose present discounted value is equal to the opportunity cost of the license. The opportunity cost may be the royalty that the licensor could expect to earn from licensing to a different licensee, or it could be the incremental profit stream that the licensor could have earned by not licensing and instead either itself exploiting the technology or holding back its use. Perhaps the most important implication of these observations is that the royalty established for any particular technology is likely to be highly dependent upon the economics of the licensor and licensee in question. Each licensing negotiation has unique characteristics, making it very difficult to demonstrate that the royalty observed for any one licensing agreement reasonably applies to another.

The same principles apply to the issue at hand. That is, the problem of setting a fee for ancillary services is analogous to that of setting a royalty rate for technology. The maximum amount that any broadcaster will be willing to pay will depend upon the expected profitability of a particular ancillary service and the perceived risk of the profit stream. If the fee is set too

high, a broadcaster may find it uneconomic to provide one or more ancillary services that would otherwise have looked profitable and will simply not provide them. The minimum that fee that the Commission should be willing to accept is the government's opportunity cost. Since the spectrum has already been granted, this cost is effectively zero. Qualitatively, then, the range of feasible royalty rates is between zero and a rate not so high as to forestall economic entry.

It may be unreasonable to expect that the royalty rate established for a particular technology in private negotiation would necessarily be comparable to the fee that would be appropriate for ancillary digital broadcasting services. It is however reasonable to look to the distribution of such royalty rates for guidance in setting a fee. The studies discussed below provide useful information about that distribution.

### **III. DISTRIBUTION OF ROYALTY RATES**

It is difficult to find publicly available information about royalty rates. The sources I have reviewed include surveys of companies that have purchased and/or sold licenses, a compendium of news items relating to royalty rates and a statistical analysis of royalty rates.

#### **A. 1992 Survey of Royalty Rates**

In June of 1992, les Nouvelles, the journal of the Licensing Executives Society, published the results of a Technology Licensing Survey.<sup>1</sup> A total of 118 firms responded with information about the rates established for technologies licensed both to and from others. These firms covered a wide variety of industries.<sup>2</sup> Figure 1 shows the results. Over 21 percent of the royalty rates do not exceed 2 percent. More than 60 percent of the royalty rates are 5 percent or less. Over 90 percent are 10 percent or less.

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<sup>1</sup> Daniel M. McGavock, David A. Haas and Michael P. Patin, "Factors Affecting Royalty Rates," les Nouvelles, Vol. XXVII, No. 2, June 1992, pp.107-116.

<sup>2</sup> Only one was in the telecommunications sector.

## **B. Compendium of Royalty Rates**

In 1997, Intellectual Property Research Associates published a compendium of information on royalty rates compiled from articles published in Licensing Economics Review over the period September 1990 through December 1996.<sup>3</sup> Figure 2 summarizes the results for all industries as computed by the authors. The distribution is quite similar to that obtained from the survey: 34 percent of the rates are 3 percent or less; 56 percent of the rates are 5 percent or less, and over 90 percent are 10 percent or less. Table 1 displays more selective results based on a closer reading of the articles listed for Communications, Electronics and Entertainment. I include only cases where (a) agreement was reported to have in fact been reached and (b) no additional payment or consideration was reported. This limited sample fairly well mirrors the broad pattern. Of the eight cases, three are at or below 5 percent, and only one is in excess of 10 percent.

## **C. 1997 Survey of Royalty Rates**

In June of 1997 les Nouvelles published the results of a survey of over 400 licensing executives worldwide.<sup>4</sup> Over 70 percent were located in the United States or Canada. This survey focused on the running royalty rates, expressed as a percent of net sales,<sup>5</sup> negotiated within the twelve-month period preceding the survey. Figure 3 summarizes the results, expressed in terms of the median high and low rates negotiated both for licensing in (i.e., purchasing a license) and licensing out (i.e., granting a license). For “minor” innovations the range is 1 to 5 percent, and for “major” innovations it is 3 to 8 percent. Only in the case of innovations characterized as “revolutionary” (i.e., suggesting highly favorable economics) do

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<sup>3</sup> Intellectual Property Research Associates, 1004 Buckingham Way, Yardley, PA 19067, Royalty Rates for Technology, 1997.

<sup>4</sup> Stephen A. Degnan and Corwin Horton, “A Survey of Licensed Royalties,” les Nouvelles, Vol. XXXII, No. 2, June 1997, pp. 91-96.

<sup>5</sup> Net sales are gross sales less discounts and returns. Net sales are thus a revenue concept and should not to be confused with net profit.

the rates rise to the 5 to 10 percent range.<sup>6</sup> Figure 4 displays corresponding ranges using sample averages rather than median values. These ranges are slightly higher, but as the authors point out, a few exceptionally high or low responses could skew the results.

#### **D. Statistical Analysis of Royalty Rates**

Circa 1994 Intangible Properties Consulting Company published royalty rates for a large number of industries, based on statistical analysis of financial and accounting data.<sup>7</sup> The data sources included proprietary databases, individual company Annual Reports, Security & Exchange Commission Forms 10-K, and publications of the U.S. Departments of Commerce and the Treasury. According to the report, the rates are "... **indicative** of the annual royalty a Licensee would pay, ... based on its sales of relevant products or services, in order to license the entire portfolio of intangible properties . . . [that] the Licensor uses in its relevant operations."

The figures in the report are subject to at least two drawbacks. First, the method of derivation is not explained, nor are the exact data sources identified. Second, the authors state that the method is not necessarily intended to indicate rates where the licensor is a not-for-profit organization (e.g., government) but that it may be used in such cases with possible upward or downward adjustment.

Table 2 displays the estimated rates for industries in the communications sector. Given the caveats noted, these results, standing alone, might be questionable. In the present context

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<sup>6</sup> Whether the economics of ancillary services would place them in the "minor" or "major" category is uncertain, given what little is known and given the vagueness of the classification scheme. It seems, in any event, unreasonable to expect the economics to be so favorable as to qualify ancillary services as "revolutionary."

<sup>7</sup> Intangible Properties Consulting Company, Intangible Properties Indicated Royalty Rates, Version 1, 1992-1993.

they serve usefully as corroborating evidence. The average “lower” rate is 3.6 percent; the average “indicated” rate is 5.3 percent, and the average “upper” rate is 6.6 percent.

Figure 1

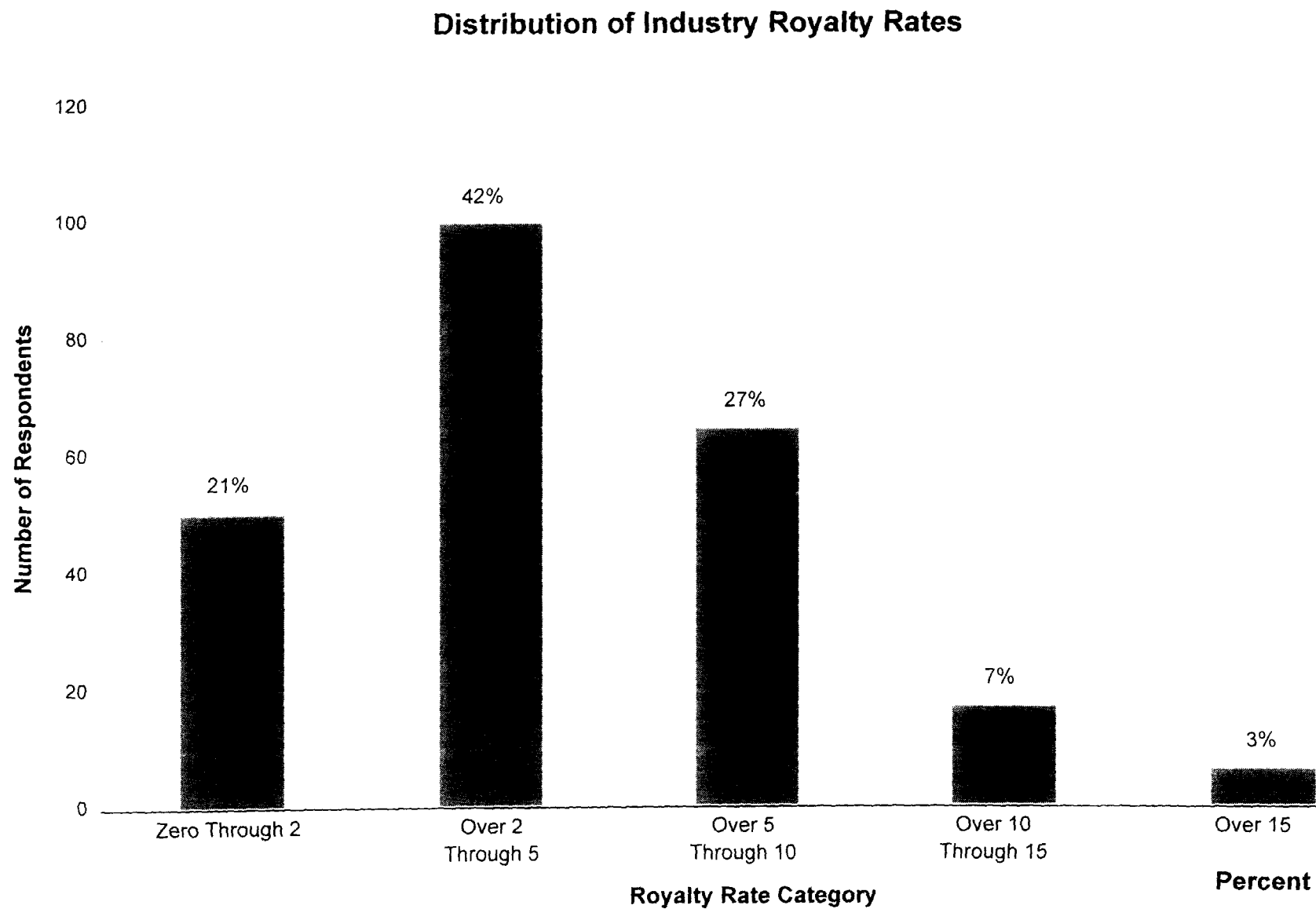
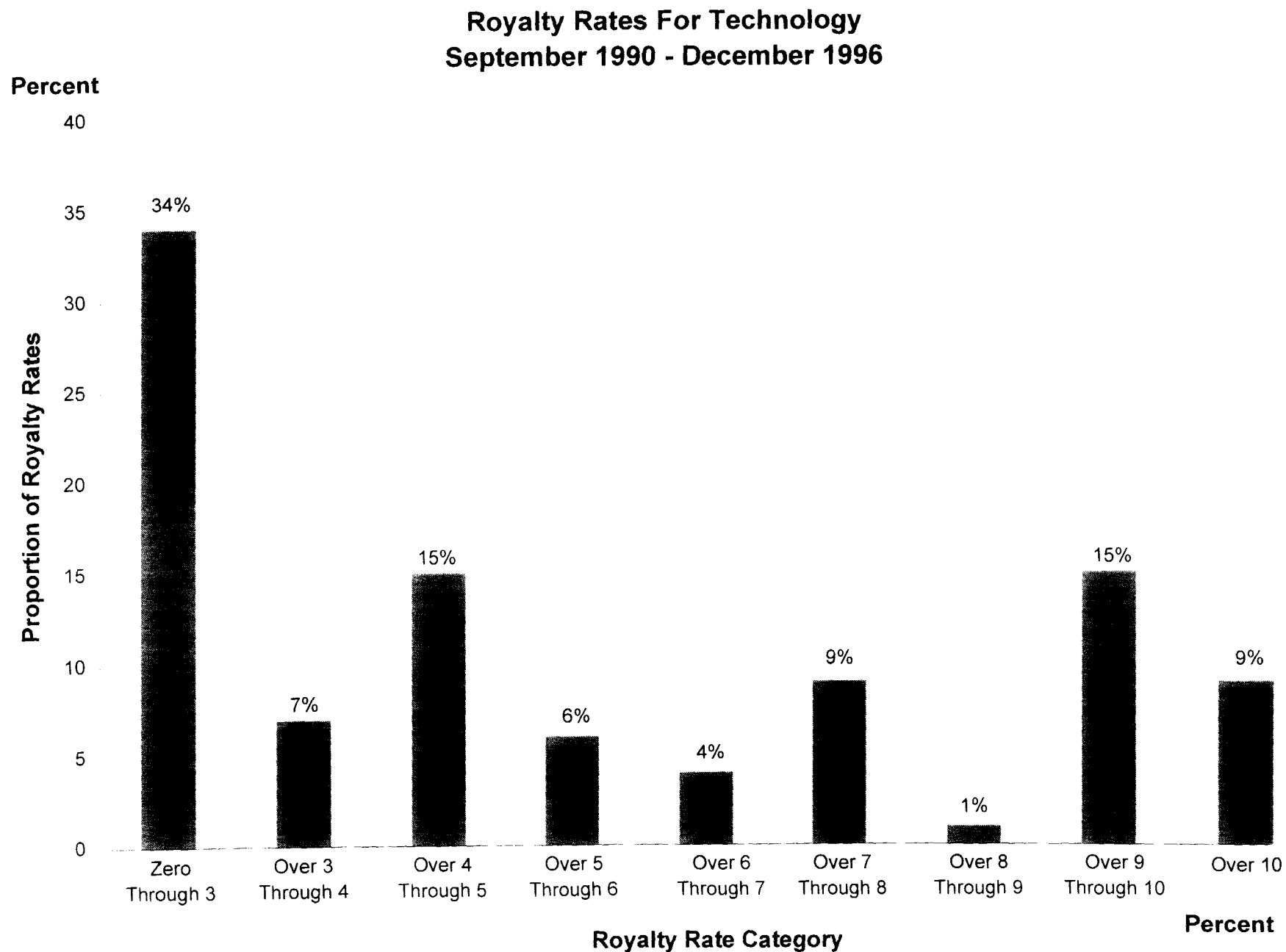


Figure 2



Source: Intellectual Property Research Associates, 1004 Buckingham Way, Yardley, PA 19067. "Royalty Rates for Technology" 1996.

Figure 3

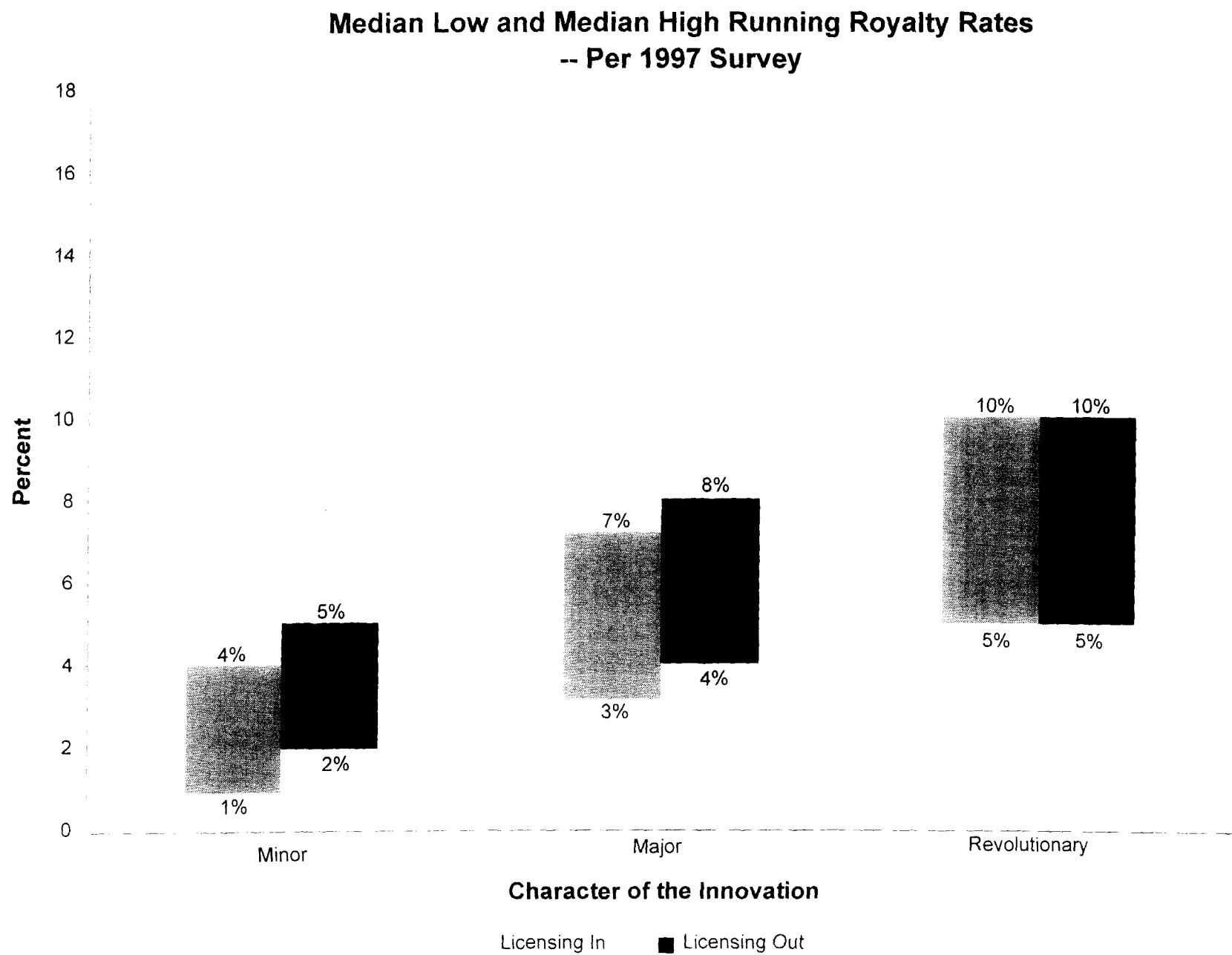
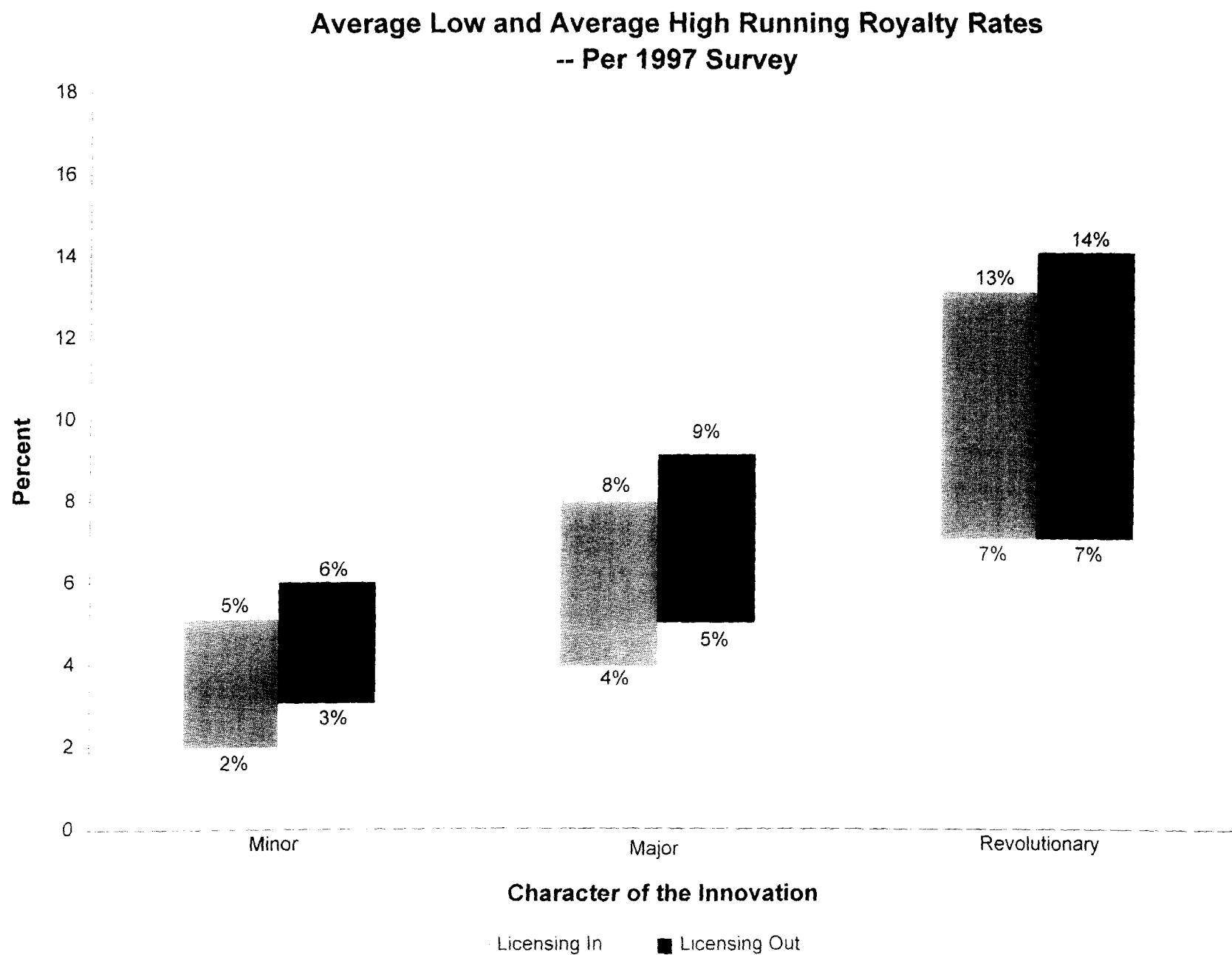


Figure 4



**Royalty Rates**  
**-- Technology**  
**November 1990 - December 1996**

<u>Industry</u>	<u>Sales Revenue</u> (percent)	<u>Page</u>
<u>Communications</u>		
(28 Articles)		
Internet Patent	1.0 - 5.0 <sup>1</sup>	39
<u>Electronics</u>		
(30 Articles)		
Bar Code	15.0 <sup>2</sup>	79
Bar Code	7.5	80
Bar Code	7.5	80
Controls	5.0 <sup>3</sup>	82
Laser	10.0	85
Machine Vision	5.0	85
<u>Entertainment</u>		
(15 Articles)		
Sound Technology	10.0	93

<sup>1</sup> For sales under \$1.0 million. For sales over \$1.0 million, the rate is determined on an individual basis.

<sup>2</sup> Royalties calculated on a sliding scale, based on volume, ceiling 15 percent.

<sup>3</sup> Resulting from a patent infringement dispute.

**Intangible Assets Indicated Royalty Rates**  
**-- Communications**

Industry Group	Royalty Rate		
	Lower	Indicated	Upper
	----- (Percent) -----		
Telephone Communications	5.3	6.7	8.0
Telegraph and Other Communications	1.9	4.2	5.7
Radio and Television Broadcasting	3.2	4.3	5.2
Cable and Other Pay TV Services	3.1	4.2	5.0
Communications Services, NEC	4.7	7.2	9.1
Average	3.6	5.3	6.6